

REMARKS

Disposition of Claims

Upon entry of the foregoing amendments, claims 1-2, 4, 10, 14-19, 21-25, 27, and 30-35 will remain pending in the application and stand ready for further action on the merits. Independent claims 1 and 27 have been amended to recite that the transfer mechanism is a rotary indexer with multiple, extendable vertical arms. Each arm has a vacuum cup for holding and carrying the object (preferably, a golf ball) to orienting stations so the object does not rotationally slip as it is being transferred from station-to-station. Each orienting station has a rotating object holder with a vacuum cup for receiving the object from the vacuum cup of the rotary indexer. The object moves by the rotary indexer to three different orienting stations so the object can go through three distinct rotational movements about perpendicular axes. These claim amendments are supported throughout the specification, particularly at page 8, lines 1-30; by the drawings, particularly Figs. 2 and 2a, and by the originally filed claims. No new matter has been added to the application. Claims 3 and 6 have been canceled and the limitations of these claims have been incorporated into amended claim 1. Dependent claims 10 and 30 have been amended to make them consistent with claims 1 and 27, respectively.

In addition, claims 7-9 and 11-13 have been canceled, since these claims are directed to another embodiment of the transfer mechanism, wherein the mechanism contains gripping members for picking-up the object, transferring it, and placing it in the orienting station. More particularly, different gripping and alignment mechanisms are described in the specification (page 9, lines 1-31 and page 10, lines 1-17) and shown in the drawings (Figs. 2a-5). In addition, claims 36-42 have been canceled since these claims are directed to yet another embodiment of the transfer mechanism, wherein the mechanism contains a compliant object carrier that is movable translationally and substantially immovable rotationally. The claims canceled herein have been canceled without prejudice or disclaimer of the subject matter contained therein.

Claim Objections

The Office Action first objects to claim 11 because of certain informalities. This objection should be considered moot, because claim 11 has been canceled herein.

Claim Rejections under 35 U.S.C. §103

The Office Action rejects claims 1-3, 5, 7-10, 12-18, 20-22, and 24-42 under 35 U.S.C. §103(a) as being unpatentable over Gordon et al., U.S. Patent 5,632,205 ("Gordon") in view of Carlson, U.S. Patent 7,283,657 ("Carlson"). In response, applicants respectfully submit that the combination of Gordon and Carlson does not render the presently claimed invention, as recited in the amended claims, prima facie obvious for the reasons discussed below.

Applicants agree with the Examiner that Gordon discloses a method of orienting a spherical object, such as a golf ball, that involves using a camera to image the object and a camera for processing the image and for computing a spatial rotation. The object is brought into the desired spatial orientation using conical wheels to support the ball and rotate it around an axis. Particularly, the wheels rotate in opposing directions, causing the ball to rotate about its vertical axis. The custom indicium, which will be printed on the ball's surface, is thereby rotated about the ball's vertical axis until the indicia intersects a plane passing through the center of the ball. Next, the wheels are rotated in the same direction, causing the ball to rotate about a horizontal axis. The indicium is thereby rotated upwards until it reaches the top of the ball, intersecting the vertical axis of the ball. The wheels then run in opposing directions, causing the ball to again rotate about its vertical axis. Then, the indicium (now located at the top of the ball) rotates about its center until it reaches the proper orientation for printing. As the Examiner recognizes, the Gordon method uses a single station to perform the entire orientation of the ball. There is no transfer mechanism disclosed in Gordon. The ball is not transferred from orienting station to orienting station. However, the Examiner takes the position that it would have been obvious to use the transfer system described in Carlson in the method of Gordon and thus asserts that applicant's invention is prima facie obvious.

Turning to Carlson, applicants agree with the Examiner that this reference discloses a system for automatically orienting a spherical object, particularly a golf ball, which involves certain processing steps at four separate work stations. Referring to Figs. 7-10 in Carlson, the method involves picking up the golf ball from the starting cup (60) at the first station (ST0) with a first transporting mechanism (76). The mechanism grips the ball and pivots through a fixed 90 degree arc, thus placing the ball in the bottom cup (62) of the first work station (ST1). The upper

cup (66) is activated to hold the golf ball securely in the bottom cup (62). The transporting mechanism then releases the ball and rotates back to a position midway between the work stations (ST0 and ST1). The golf ball is released at the first work station (ST1) by retracting the upper cup (66) which holds the ball in the bottom cup (62). Then, the ball is conveyed from the first work station (ST1) to the second work station (ST2) by means of the second transporting mechanism (78) operating similarly to the first transporting mechanism (76). (Col. 13, lines 53-67 and Col. 14, lines 41-51.)

In Carlson, the transporting mechanisms (76, 78, 80, 82) used for conveying the ball from one work station to the next station are connected by a beam (92). There is no disclosure or suggestion in Carlson for a rotary indexer.

The transposing mechanisms 76, 78, 80, 82 are mounted to pivot points 84, 86, 88, 90, respectively, and all four transposing mechanisms 76, 78, 80, 82 are linked together by a beam 92 to a stepper motor 94 that pivots the transposing mechanisms 76, 78, 80, 82 about the pivot points 84, 86, 88, 90, respectively. (Col. 13, lines 5-10.)

Moreover, as the Examiner recognizes in the Office Action, there is no disclosure or suggestion in Carlson for using vacuum cups to carry and place the golf balls in each work station so the ball may be properly oriented. Applicants have developed a system, wherein vacuum suction cups are engaged in the entire process, particularly picking-up the ball, transferring and placing it in position, and then releasing it to a vacuum cup in an orienting station. Using a rotary indexer with vacuum cups is an important feature of applicants' system because it prevents the ball from rotationally slipping during the indexing motion. The ball does not rotationally slip as it is being transferred from station-to-station. The vacuum cups keep the ball in its properly rotated position during the entire process. For example, the ball may be first transferred from imaging station (10) to first orienting station (40), where it is rotated about vertical axis (V). The ball is then transferred in its rotated position to second orientating station (50), where it is rotated about horizontal axis (H). Finally, the ball is transferred in its newly rotated position to third orienting station (60), where it is rotated about vertical axis (V).

Keeping the ball in its properly rotated position as it is being picked-up, transferred, and placed in each orienting station is critical to applicants' method. Once the ball is rotated to a first position in one orienting station, it is important for the ball to remain in that position until it is ready to be rotated to a second position in the next orienting station. The ball needs to be held in place between each rotation. Applicants' system works well because the vacuum cup tightly and precisely holds the ball in place as it is being moved out of one station and into another. It is respectfully submitted that Carlson does not provide any guidance or suggestion to a person of ordinary skill in the art for a rotary indexer having multiple vacuum cups for holding and carrying the ball to different orienting stations. Moreover, even if a person of ordinary skill in the art turned to Welchman et al., U.S. Patent Application Publication 2001/0012389 ("Welchman"), it is respectfully submitted that the present invention still would not be obvious.

Welchman is interested in an automated golf ball inspection system for determining the quality of surface treatments (for example, primer coatings, ink, or paint) applied to golf balls. The coated golf ball is inspected for quality using a camera or photocell imaging device. As the Examiner points out, the inspection system may include a "pick and place mechanism" (88) to transfer golf balls with indicia (for example, company name or logo) meeting quality control standards to the next processing station and/or to transfer golf balls with indicia that does not meet quality control to a reject bin. The pick and place mechanism (88) may be in the form of an automated transfer mechanism such as a robotic arm with vacuum plungers. (Paragraph 0071.) However, Welchman does not teach using a vacuum cup to pick-up the ball and release it to a vacuum cup in an orienting station in such a manner that the ball does not rotationally slip. It is important that the vacuum cup in the orienting station firmly holds the ball in place and keeps the ball in its rotated position before it is picked-up and transferred to the next station. Thus, the vacuum cups in the orienting stations must provide sufficient suction and then stop suction so the ball can be picked-up and transferred by the vacuum cups of the rotary indexer to the next station. There is no disclosure or suggestion in Welchman for a rotary indexer having multiple vacuum cups for holding and carrying the ball to orienting stations, each station having a vacuum cup for receiving the ball so the ball does not rotationally slip during transfer from station-to-station, and wherein each cup rotates about a single axis so the ball is placed in proper orientation. Thus, a skilled artisan looking at the teachings in Welchman and combining them

with the teachings in Carlson would only be motivated to develop the presently claimed method by looking at applicants' own specification. It is respectfully submitted that such hindsight reconstruction of the claimed invention is not permitted.

Next, the Office Action rejects claims 4, 6, 11, and 23 under 35 U.S.C. §103(a) as being unpatentable over Gordon in view of Carlson and further in view of Welchman. As the Examiner recognizes, claims 4 and 23 are dependent upon amended claim 1, and claims 6 and 11 have been canceled herein. Applicants believe that amended claim 1 is in condition for allowance for the reasons discussed above. Thus, dependent claims 4 and 23 should be allowable as well. The Gordon, Carlson, and Welchman references are discussed in detail above, and applicants believe that amended claim 1 is allowable over the teachings therein.

Lastly, the Office Action rejects claim 19 under 35 U.S.C. §103(a) as being unpatentable over Gordon in view of Carlson and further in view of Gentiluomo, U.S. Patent 3,778,067 ("Gentiluomo"). Claim 19 is ultimately dependent upon amended claim 1. Applicants believe that amended claim 1 is in condition for allowance for the reasons discussed above and claim 19 should be allowed accordingly.

Addressing the Gentiluomo reference, this patent is directed to a golf ball teeing apparatus having a reciprocating tee to elevate the ball from a lower ball receiving position to either an intermediate ball hitting position or an upper ball hitting position; a ball dispensing means for storing a plurality of balls; and a ball receptacle for receiving or storing balls. The tee elevation can be selected either manually by push button or automatically through program control. The apparatus uses gear motors, switches, solenoids, photoelectric proximity switches, acceptor units, and the like that are commercially available components. However, Gentiluomo does not teach a rotary indexer having multiple vacuum cups for holding and carrying the ball to orienting stations, each station having a vacuum cup for receiving the ball so the ball does not rotationally slip during transfer from station-to-station.

In view of the foregoing, it is respectfully requested that the rejection of the claims under 35 U.S.C. §103(a) over Gordon et al., U.S. Patent 5,632,205; Carlson, U.S. Patent 7,283,657;

Welchman et al., U.S. Patent Application Publication 2001/0012389; and Gentiluomo, U.S. Patent 3,778,067, taken alone or in combination, be withdrawn.

Conclusion

In summary, applicants submit that claims 1-2, 4, 10, 14-19, 21-25, 27, and 30-35 (as amended) are patentable and each of the Examiner's objections and rejections has been overcome. Accordingly, applicants respectfully request favorable consideration and allowance of amended claims 1-2, 4, 10, 14-19, 21-25, 27, and 30-35.

The Commissioner is hereby authorized to charge any additional fee required in connection with the filing of this paper or credit any overpayment to Acushnet Company, Deposit Account No.: 502309. Should there be any outstanding matter that needs to be resolved in the present application; the Examiner is invited to contact the undersigned at the telephone number provided below.

Respectfully submitted,

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